BOSTON MECHANIC,

AND

Journal of the Useful Arts and Sciences.

DECEMBER, 1835.

DAVID RITTENHOUSE.

THE following short sketch of the life of a worthy and eminent man, is compiled from an article written by the Editor of Waldie's Portfolio, at the request of the publishers of the National Portrait Gallery.

DAVID RITTENHOUSE, was one of those to whom the title of a great man truly belongs;—one who, by the efforts of his own mind, and by his own energy of character, secured to himself, as such, the respect and esteem of all who knew him.

He was born near Germantown, Pennsylvania, April 8th, 1732. His parents emigrated from Holland, and had been distinguished, as well as their progenitors, for probity, industry and simple manners.

The youth of Mr. Rittenhouse was passed on the farm of his father, in the county of Montgomery, twenty miles from Philadelphia, whither his father removed during the childhood of his son. His peculiar turn of mind there manifested itself; his plough, the fences, and even the stones of the field in which he worked, were found covered with figures denoting a talent for mathematics. He early made himself acquainted with Newton's Principia, through the medium of a translation, and also studied the science of fluxions, of which, for a considerable time, he believed himself to be the inventor.

His health, never robust, unfitting him for hard labor, his father consented that he should acquire the trade of a clock and mathematical instrument maker. A trunk containing tools which had been the property of a maternal relative,

afforded the instruments with which he worked, and he was mainly his own teacher.

From the age of eighteen to twenty-five, his time during the day was actively employed upon his labors, while the night, or his idle hours, (as he called the time for sleep,) was devoted to study. It was during this double occupation, that Mr. Rittenhouse projected and completed an orrery—an instrument which required the union of knowledge and mechanical skill of the highest order, and which he succeeded in making more complete than had been done by former astronomers. A description of this instrument will be found in the first volume of the Transactions of the American Philosophical Society. It was purchased by Princeton College, New Jersey, where it still remains. It exhibits the positions of the planets and their satellites at any given period of the world, past, present or future; thus forming a perpetual astronomical almanac, where the results, in lieu of being found in tables, are actually exhibited to the sight. He completed a second, after the same model, for the college of Philadelphia, now the University of Pennsylvania.

As might be expected, his fame was not a little spread abroad by his orrery, which had become the wonder of the learned everywhere. Several scientific gentlemen interested themselves in him, and persuaded him to take up his residence in Philadelphia, where he continued to manufacture mathematical instruments, which were considered superior to any imported.

Having previously joined the American Philosophical Society, he made a communication to that body, respecting the transit of Venus, which was to occur on the 3d of June, 1769, and was appointed on the committee to observe it in the township of Norriton. In the preparations for this observation, he was extremely active and useful; the management and construction of the apparatus being perfectly familiar to him. The phenomenon had been observed but twice by the inhabitants of our earth; it would never be again visible to any person then alive; and on it depended many astronomical calculations. Under such circumstances, our young stargazer was of course in a state of mental excitement and solicitude. The sun of the day rose without a cloud; the moment of observation came—the great event occurred as Rittenhouse predicted, and so excited was he at the circumstance, that in the instant of the contact of the planet with the sun, he actually fainted with emotion. His report was received with satisfaction everywhere, and extended still farther his reputation.

In 1775, he delivered the annual oration before the Philosophical Society, which comprehended a lucid history of astronomy, and though delivered in a feeble voice, and without the art of the skilful orator, it commanded profound attention. In 1791, he was elected to fill the chair of President of the Society, vacated by the death of Dr. Franklin; and his attachment to the Society was evinced by a donation to its funds of the sum of three hundred pounds.

He was employed at various times in numerous important surveys, by several state legislatures, a business for which both his mathematical attainments and practical skill in the use of instruments eminently qualified him, and which he fulfilled, without doubt, in a manner perfectly satisfactory.

Besides his favorite study, astronomy, to which most of his time was devoted, and which was the subject of most of his communications to the Transactions of the Society to which he belonged, he had also paid attention to theology, and was well acquainted with practical metaphysics, was a great reader, a musician and a poet, and had acquired an intimate knowledge of the French, German and Dutch languages, in which he took delight to peruse the works of the learned of those countries. His name was known and revered in every place where science was respected; wherever he went he was honored.

In 1768, he received the degree of Master of Arts from the college of Philadelphia, and in 1784, from the college of William and Mary. The college of New Jersey made him a Doctor of Laws, and he was elected a member of the American Academy of Sciences at Boston, in 1782, and of the Royal Society of London, in 1795.

From 1777 till 1789, Mr. Rittenhouse held the office of Treasurer of the state of Pennsylvania. In 1792, he reluctantly accepted the appointment of Director of the Mint of the United States, but his health obliged him to resign it in 1795.

He died Oct. 15, 1796, at the age of 64 years. His remains were at first deposited, agreeably to a request made by him, beneath the pavement within his small observatory, which he had built in his garden. The observatory having been taken away, his remains were removed to the cemetery adjoining the Presbyterian Church in Pine Street, where they are covered by a plain marble slab, with an appropriate inscription.

In stature, Dr. Rittenhouse was somewhat tall; in his person, slender and straight; and although his constitution, which he had impaired by sedentary labor and midnight

studies, was delicate, his bodily frame did not appear to have been originally weak. All his features were good; forehead high, capacious and smooth; his grayish-colored eyes expressed animation, reflection and good nature.

His economy extended to a wise and profitable use of his time. He was never unemployed, giving once as an apology for detaining a friend a few minutes, while he arranged some papers he had been examining, that 'he had once thought health the greatest blessing in the world, but that he now thought there was one thing of much greater value, and that was time.'

'His manners,' observes Dr. Rush, who was an intimate friend of his, 'were civil and engaging to such a degree, that he seldom passed an hour, even in a public house, in travelling through our country, without being followed by the good wishes of all who attended upon him. There was no affectation of singularity, in anything he said or did; even his hand-writing, in which this weakness so frequently discovers itself, was simple and intelligible at first sight, to all who saw it. His modesty was so conspicuous in every part of his conduct, that he appeared not so much to conceal, as to be ignorant of, his superiority as a philosopher and a man, over the greater part of his fellow-creatures.'

Finally, for we must end somewhere, and cannot find room for much that is said of him, he was not only a self-taught man, and a great man—one of the greatest men of our country, but a good man—a Christian; and from this circumstance, no doubt, flowed a great part of that modest simplicity of character, and amiableness of deportment which won for him everywhere the good will of all who knew or saw him.

ORDERS OF ARCHITECTURE.

A PORTION of the following description is taken from a book, called the 'First Book of the Fine and Useful Arts,' an interesting and useful though small work.

NOTHING, but the buried cities of Pompeii and Herculaneum, remains, to show us the character of the domestic architecture of the ancients; and these specimens are merely of a single nation. But there are found the most noble monuments of temples and public buildings in Greece, Rome and Egypt, which convince us that however little the conveni-

ences of individuals might have been studied in dwelling houses, the highest degree of taste was put forth, to give the greatest effect to public edifices, especially those destined for the worship of their gods.

From the simplicity, in which, at the same time, consisted a great part of the beauty, of a Grecian temple, and from the absence of the multiplied doors and windows, which cut up the fronts of our buildings, the columns or pillars, became a much more conspicuous portion of a building than is the case with us. So much was this the case, that the different styles of forming the columns became the foundation and the distinction of what are called the Orders of Architecture. Both from their importance, as supporters, and therefore a principal part of the building, and from their conspicuousness, on which account their effect gave character to the general effect of the building, they became justly the main distinction of the styles of architecture.

There were five styles, which, from their acknowledged beauty and good taste, became classic models, which every one who adopted Grecian architecture followed, as safe standards. These are the five orders of architecture, so called, viz., Doric, Ionic, Tuscan, Corinthian and Composite. A few general explanations will be necessary, in order better to understand the description of them.

A column is generally composed of three parts, a shaft or middle portion, a base or foot, on which it stands, and a capital or block at the top, on which the part supported by it immediately rests.

The foot or base of a column usually rests on a pedestal, or ornamented square block, though in the more simple styles, it stands immediately upon the pavement.

The continuous portion of the building which rests immediately upon the columns, is called the entablature, a portion of which is represented in the first engraving, by *b d*, extending back from the column. The bottom of the entablature, *b*, is called the architrave, the middle part, *m*, the *frieze*, and the uppermost part, *d*, the cornice. This crowns the building, and corresponds to the projection of the eaves, in our common houses.

In each order there is a proper proportion between the height and size of a column, which is expressed by reckoning it so many diameters high. The more massive orders are of course, thicker in proportion to their height.

The most ancient and most simple of the orders is the Doric, probably so named because invented or used by the

Dorians, one of the tribes of Greece. The cut, (fig. 1,) represents the summit of a Doric column, with its capital, and the entablature. The Pantheon at Athens is considered the standard model of the Doric order. It is very massive, being only six diameters in height. It has neither pedestals nor bases to the columns. This order is also distinguished by the division of the frieze into portions by vertical projections, called *triglyphs*, under which is a row of small ornaments called *guttæ*, or drops, and between which is a space where sculptures were made.

Fig. 1.

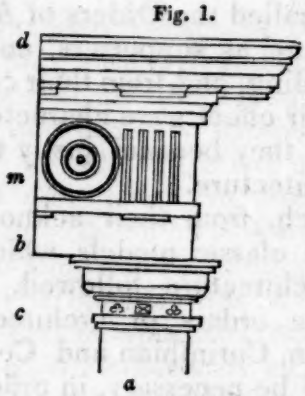


Fig. 2.

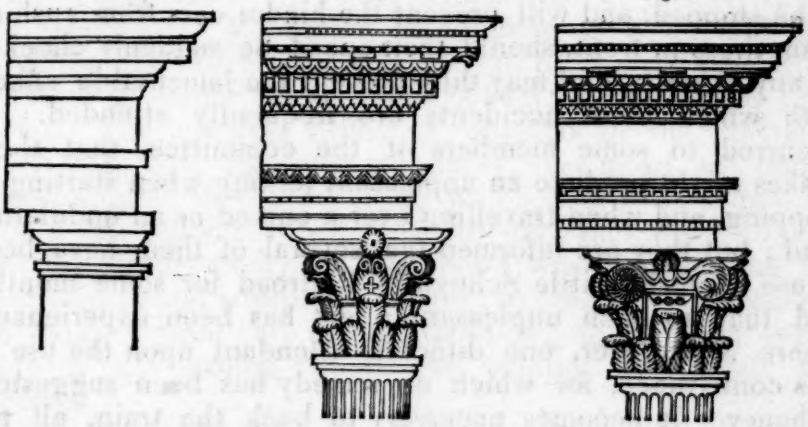
The Ionic order had its origin soon after the Doric. It was originally eight diameters in height, afterwards eight and a half, and by the Romans was increased to nine. This order is characterized by its capital, being ornamented with a scroll called a volute. The Greeks had two of these on parallel sides, and on the others was the baluster. These volutes, according to some, are imitations of locks of hair adorned with flowers; others say that the convolutions of a shell suggested the idea; while according to others, they were intended to represent the horns of *Jupiter Ammon*. The entablature of the Ionic order is adorned with more mouldings than the Doric. Fig 2 represents the Ionic order.

Of the Tuscan order (fig. 3.) there is no ancient specimen extant, and all our knowledge of it is obtained from description. It differs from the Doric in being seven diameters high.

The Corinthian order (see fig. 4,) is ten diameters in height, and is more slender and ornamental than either of the others. Its capital is richly ornamented, and is made in imitation of a plant, (the acanthus.) It has been compared to an inverted bell, the bottom of which is adorned with leaves and the top

with volutes. It is supposed to have had its origin in the accidental circumstance of a basket having been set on an acanthus plant, whose leaves grew up around it, and concealed it.

Fig. 3 Fig. 4. Fig. 5.



The Composite order (see fig. 5,) is supposed to have been invented by the Romans, more for the sake of pleasing their vanity than for its use. It is a compound of the Corinthian and Ionic. It has the proportions of the Corinthian and the volutes of the Ionic. Its shaft resembles the Corinthian, and its entablature the Tuscan. The Corinthian capital has three rows of leaves, the Composite but two.

SELF-ACTING BRAKE FOR RAILROAD CARS.

THE following is the Report of the Committee on Arts and Sciences, of the Franklin Institute, on a Self-acting Brake, for Railroad Cars, invented by Mr. J. K. Smith, of Pottsville, Schuylkill county, Pennsylvania.

THIS invention consists in a rod or slide, attached to the front part of the frame of the car, which is pressed in whenever the car comes in contact with the one before it. The motion of this slide brings the brakes into contact with the wheels, by means of a suitable arrangement of levers, or by a chain passing around a pulley. As soon as the contact of the cars ceases, the brake is freed, either by its own weight or by a spring.

As Mr. Smith claims the principle of acting upon the brakes by the contact of the cars, and has proposed several different modes of effecting this, it is unnecessary to describe any particular arrangement.

The principal advantages of this invention are, that it will relieve the engine from the pressure of the train, when about to be stopped, and will prevent the hinder cars from rushing upon those in front, should their speed be suddenly checked by any casualty, and may thus prevent the lamentable effects with which these accidents are frequently attended. It occurred to some members of the committee, that these brakes might produce an unpleasant jerking when starting or stopping, and when travelling over a curved or an undulating road; but they are informed that several of them have been in use upon the Little Schuylkill Railroad for some months, and that no such unpleasant effect has been experienced. There is, however, one difficulty attendant upon the use of this contrivance, for which no remedy has been suggested. Whenever it becomes necessary to back the train, all the brakes must be thrown out of gear, and the time consumed in this operation may be of the greatest importance at a critical juncture. Notwithstanding this objection, the committee are of the opinion that the use of this brake will tend to diminish the danger of railroad travelling, and they would recommend a trial of it to those who are concerned in that mode of transportation, believing that it will be found worthy of their attention, both in a benevolent and profitable point of view.

By order of the committee.

August 15, 1835. WILLIAM HAMILTON, ACTUARY.

PAINTED BINDING.

[From the London Mec. Magazine.]

MANY beautiful subjects may be formed on the sides of books by workman skilled in painting. The volume is prepared by being pastewashed, so as to present an uniform fawn color, the designs slightly traced, and afterwards colored according to the pattern, the colors being mixed to the proper shade with water. The shades must be tried on pieces of refuse leather, as being spirit colors, when once laid on, no art can soften them down if too strong; and a peculiar light-

ness of touch will be necessary to produce effect. Portraits, &c., may also be executed in this manner; and many superb designs have at times been executed by the best binders of this country and France. M. Didot, bookseller of Paris, presented a copy of the 'Henriade,' published by himself, to Louis XVIII., most elegantly ornamented in this style. It was executed by M. Better, bookbinder, of Tours, and presented on one side a miniature portrait of Henry IV, and on the other a similar one of Louis XVIII., both perfect likenesses. The greatest difficulty consisted in the portraits, which were first imprinted on paper, very moist, and immediately applied to the cover, on which they were impressed with a flat roller. When perfectly dry, they were colored with all the art of which the binder was capable, and the other ornamental paintings executed by hand. This proceeding requires great care in the execution; and will be applicable to any design where the binding will justify the expense.

MUSICAL LANGUAGE.

[Original.]

It is at first thought a curious, but not an improbable idea, that a significant language should be formed by combinations of musical sounds. In a late number of the London Mechanics Magazine, we find some notices of a plan of this kind proposed some years ago by a M. Sudre to the French Academy of the Fine Arts, to which he gave the name of a 'Musical Language.'

From experiments made in their presence, the Academy came to the conclusion that 'the author had perfectly attained his end, that of creating a musical language, and that a system of telegraphic communication might be established by means of this language, by the aid of musical instruments, far superior to any hitherto in use; inasmuch as it would enable men to correspond with each other instantaneously at great distances, not only during the most profound darkness, but in circumstances under which, even in open day, no communication by visible signals could possibly be carried on.'

A military commission, to whom the invention was referred, reported that it 'might prove eminently useful in establishing a correspondence between the different corps of an army;

and they give several instances in which it might have been the means of saving an army from discomfiture.

Again, the invention was investigated by a commission of naval officers, who reported it to be their unanimous opinion that 'it would be a powerful auxiliary to the means at present used, in the navy, and ought to be immediately adopted. From a series of experiments made by them in the Bay of Toulon, it appears that it only required two minutes to transmit, by means of the musical language, from one point to another, 9000 feet distant, three orders taken from the book of signals.'

We are not informed of the plan on which the language is constructed; whether musical sounds of longer or shorter duration, are appointed as symbols of the alphabetical characters, wherewith words may be spelled, or whether it may not be more analogous to the numerical telegraph, in which the combinations of figures, (or sounds,) are arbitrarily made to represent words or sentences. Mr. Sudre, the inventor, is said to be now in London, 'for the purpose of unfolding all the details of his system to the English public; having met with but poor encouragement from the government of his own country.'

Though the musical telegraph—owing to the less rapid transmission of sound, as well as the small distance to which it can be transmitted, compared with light—must be of course, less expeditious than the *visible* telegraph, yet there are other circumstances, which for more ordinary cases, would seem even more than to counterbalance this objection. The expense of stations for the musical telegraph would be comparatively nothing. No machinery—no difficulty in regard to procuring sufficiently elevated positions—no apparatus but a bugle or horn,—and the only item of increased expense resulting, perhaps, from the necessity of employing a greater number of station men, on account of the greater nearness of the stations.

It has been proposed to make audible communications to distant places, through tubes laid as conductors of sound; but how much more simple—at least, how much more certain—the communication by means of a musical telegraph! And it may be employed where the visible telegraph could not be, for want of commanding stations; *when* it cannot be, on account of the occasional obscurity of the atmosphere, or the darkness of night; signals can be received at any time, and answered without previous arrangements, which cannot be done with the visible telegraph; and finally, a musical tele-

graph line can be set up anywhere, at a short warning, without any previous expense or preparation, and of course, be made useful where the expense of any other establishment of the kind would forbid its institution.

INDIA RUBBER LIFE-BOAT.

[From the London Mec. Magazine.]

It is proposed to construct the framing of the boat of tubes of India Rubber, (of any required length and diameter,) each secured by a cover of patent water-proof canvas. Having provided a sufficient number of these, in proceeding to put them together, they are to be laid flat on the ground, the longer ones outside; across which, at certain intervals, are to be laid shorter tubes of somewhat greater diameter, to which they are to be firmly lashed by thongs or other means. To each end of the transverse tubes, are to be attached thimbles and lanyards; and underneath all, fore and aft, is to be a tube longer than those at the side, fitted at each end with the necessary number of thimbles and lanyards for attaching the ends of the side-tubes. All things being thus prepared, the cross tubes are to be bent upward by receiving the lanyards through their opposite thimbles, and drawing them together will give the bottom of the boat a rounded form. The ends of the fore and aft tubes are then to be attached to the ends of the long centre-tube, when, by drawing all parts closely together, the ends of the vessel will be secured, and the stem and stern formed like those of a whale-boat.

In order to prevent the sides of the boat from being pressed inwards, as well as to form seats for the rowers, a series of circles, formed of the same materials, are to be placed between the cross-tubes, and lashed firmly to them and to each other. The whole is then to be enclosed within two covers of patent canvas; the one outside to be finer than the other, and paid over with liquid India Rubber, to facilitate its passage through the water. Outside of all, about six inches below the gunwale, is to be placed on each side a tube of the same material, double the diameter of the others in the centre, but tapered off to nothing at the ends, and covered with leather, which would serve as a fender on going alongside ships in distress, and together with bags of water for

ballast, would effectually prevent the boat from being capsized.

To obviate the chance of any of the tubes being wounded, and so permitting the escape of the air, it is proposed to have transverse partitions of India Rubber placed in each of them at short intervals.

AMERICAN PATENTS.

[Abridged from the Journal of the Franklin Institute.]

PATENT *for a Combined Rotary and Stationary Spindle;* Charles Jackson, Stephen S. Potter and John Miller, Providence, Rhode Island, April 2.

This spindle, as the name indicates, is to be divided into two parts; the upper portion, which carries the flyer, revolves in a cast-iron rail at the top of the spindle, there being a whirl on it just below the rail, and immediately below this the flyer forks off; the spindle descends about an inch within the flyer, and tapers to a blunt point. It is perforated through the centre, at top, and laterally under the whirl, to allow the yarn to pass through, and to the curl of the flyer.

The stationary spindle is capable of sliding up and down in cast-iron cross bars; it is lowered when a spool is to be put on, and has a contrivance for keeping it in place when raised. It is perforated at its upper end to receive the tapered end of the revolving spindle, the point of which rests against the bottom of the perforation. The upper spindle is kept from falling by a tightening wire, which crosses the frame under the whirl.

PATENT *for a machine for Pressing Brick from Dry Clay;* Nathan Sawyer, Mount Vernon, Knox county, Ohio, April 8.

The defect of machines which have been heretofore made, is that they have been deficient in power. The present one seems in some measure to remedy this. The pressure is applied by means of a toggle joint. One of the important particulars of the invention is, that the sides of the mould are made concave on the upper edge, the concavity commencing about an inch from the end of its interior, and descending in the middle about an inch, the object of which is, to leave a larger portion of clay at each end than in the middle, without which the bricks would be unsound.

PATENT *for an improvement in the manner of Fastening Bedsteads;* Benjamin F. Berry, Utica, Oneida county, New York, April 24.

This is a new, and we think, a good mode of fastening bedsteads together. A hook of cast iron, five eighths of an inch thick, two inches wide and six long, is fastened into the post by a dovetail and wedges; the hook part projects out, and passes into a notch in the rail, and an eccentric pin is inserted in a hole on the inside of the rail, in such a way that the eccentric part acts upon the hook, and tightens the frame. The objection to the fastening is the projecting of the hook from the post to the distance of four inches or more, when the bedstead is down.

PATENT *for Manufacturing Hoes;* Isaac Hinman, Hamden, New Haven county, Connecticut, April 22.

This patent is taken for the particular manner in which the patentee cuts the upper part of the plate from which the hoe is to be made, so as to bend over and weld to form the eye. The claim made is to 'the method of forming the eye and the blade of the hoe from the same plate, without welding or riveting them together, and thereby enabling the manufacturer to make them from plates of a size and thickness suited to the kind he is making.

PATENT *for Machinery for Diminishing Friction;* Benjamin Hinkley, Fayette, Kennebec county, Maine, April 14.

This anti-friction machinery is the same which we have had to notice a great number of times, as although it is about fifty years old, it still finds its way, every year or two, to the patent office as a novelty. Scarcely a school book, containing the elements of Natural Philosophy, appears without a cut of Garnet's friction rollers, and in the present instance, we must in charity conclude that the impression made upon the mind of the boy has been retained with no more distinctness than has sufficed to make the man think himself an inventor.

WEAVING WIRE.

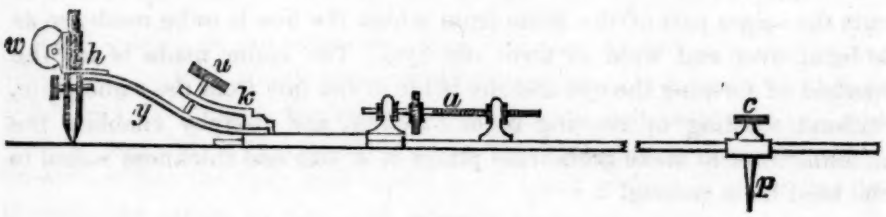
[From the London Mec. Magazine.]

IT is not generally known to what degree of perfection this art is carried. I have lately seen a specimen of wove-wire gauze in which there are not less than 150 holes in the inch long, manufactured by Mr. Corcoran. The idea struck

me that this article might be used with advantage in many manufactures where lawn and linen are now used. The degree of fineness in this fabric, which tears like paper, is very great; and the texture and appearance are really beautiful. It has not hitherto been used for any purpose that I can discover; but with the march of improvement, and the consequent application of new means, I shall not be surprised some day to see our ladies' ribbons composed of extremely fine wire thus woven.

TRAUTWINE'S BEAM COMPASS.

[From the Journal of the Franklin Institute.]



Having recently had occasion to draw several maps of railroad surveys, on a large scale, I was at a loss for a beam compass, of a length sufficient for striking the curves, and in consequence, contrived for that purpose, the one here described.

The instrument consists of a strip of brass, (mine is three and a half feet long, half an inch wide, by one twelfth of an inch thick,) having its edges rounded, to prevent its catching in any inequalities in the paper, and being divided and numbered into feet and inches, or in any manner that may be preferred.

Precisely in the centre line of the strip, and at each point of division, is carefully drilled a very small circular hole, entirely through the brass, and barely large enough to admit the finest sewing needle. Pains must be taken to drill these holes *precisely vertical.*

At that end of the beam where the numbering of the divisions commences, is a sliding vernier, by which the divisions may be subdivided into hundreths of an inch. This slide is moved along the end of the beam, by means of the screw, *a*, and is furnished with a holder, *h*, into which a

pencil or drawing pen may be inserted. It has also a screw, *u*, which, by operating on the stiff piece of brass, *k*, above, and the elastic piece, *y*, below, forces the pencil, with any required degree of pressure, against the drawing. The lower piece, *y*, is elastic, that it may, by yielding, allow the pencil to play over any roughness or knots, that the paper may contain; and is very essential to the drawing of a clear, unbroken line. *c* is a sliding piece of brass, with a point, *p*, and a semicircular hole, on the top, (for seeing the dimensions on the beam.) It will often be found useful for ascertaining the centre of a circle by trial, when it is inconvenient to do so by calculation.

As the size and proportion of the parts of the slide, (particularly of the spring and pen,) are of great importance, and mine are the result of several trials, I have represented them at one quarter the full size, to enable others to make them with certainty at the first attempt.

The drawing ink should be perfectly clean and free from dust, and of a certain degree of fluidity, which a few trials will point out.

The paper should be brushed with a clean handkerchief, to remove dust, before beginning to draw the curves.

The dimensions above stated I consider sufficient for beams six feet long, which gives a diameter of twelve feet, a size which is very rarely exceeded in neat finished drawings on paper.

For radii less than three feet in length, both the breadth and thickness of the strip may be reduced.

To use the instrument, having first found the centre from which the curve is to be described, drive a fine needle firmly and vertically into it; and over the needle, place that division hole of the beam which more nearly corresponds with the required radius; after which, bring the pencil *precisely* to the point of beginning of the curve by means of the screw, *a*; and after giving it a proper degree of pressure on the paper, by turning the screw, *u*, describe the curve by merely pushing the beam over the pa er, without any other vertical pressure than what arises from its own weight. When one line is drawn, and the pencil is to be taken back, to commence another, it may be raised from the paper, either by unscrewing *u* a little, or by slightly lifting the whole slide. It will not be necessary to lift the beam off the needle, for the purpose of altering the position of the pencil, for drawing concentric curves whose difference of radii does not exceed the play of the slide, as that may be done much more readily by the screw, *a*.

In this manner, any number of curves may be described from one point, without the least enlargement of the centre hole in the paper; a defect to which all other beam compasses I have ever seen, are liable. This is subject to so little spring or irregularities of any kind, that I have, in the width of *one inch*, described *one hundred* concentric curves, *of seven feet diameter*, precisely equidistant, with as much neatness, accuracy and clearness, as I could have drawn the same number of small ones, with a pair of common six inch dividers.

The instrument is peculiarly adapted to cases where the centre is on the same plane as the drawing, and where the beam will be supported throughout its entire length, or where it may be upheld by intermediate supports, sufficiently near each other to prevent any degree of sagging; but where it is impossible to support it between the centre and the pencil, it is not by any means to be recommended.

When the curves are finished, the needle may be easily withdrawn, either between the legs of a pair of common dividers, or between the blade and back of a penknife. A hole should be made in the beam, for hanging it up.

A PLEA FOR THE LABORING CLASSES.

BY GEO. W. LIGHT.

THE following 'plea,' from the last number of the New England Magazine, we do not hesitate to publish, notwithstanding its length, considering the subject, which is one of vital importance to our friends the mechanics in particular, and the highly respectable authority under which it is given to the public.

IT now seems to be pretty well settled, that the preservation of the institutions of this country depends mainly upon the more universal and better education of what are called the laboring classes; that this rapidly increasing population must constitute no inconsiderable portion of the understanding, as well as the bone and sinew of the republic. The general right of suffrage placing the power of government within their reach, whatever may be their qualifications or increase, it certainly behoves us to inquire, whether they shall be swayed, to a great extent, by men practiced in all the arts of political deception, or whether they shall be so far enlightened as to understand the principles of the government under which they live, and be able to act wisely for themselves in all their political relations.

Is it not high time that all who are interested in perpetuating our institutions, should be awake on this subject? It matters little what political party has the ascendancy; it is a plain case, that if the great body of our people are not capable of acting the part of free citizens, the government, under whatever form it may be administered, cannot long be maintained. Now it seems to us, that, having found the *root* of most of the evils our nation has to encounter—namely, popular ignorance—the efforts of every friend of the country ought to be directed towards the annihilation of this great enemy of moral and political freedom. If this be not done, and more wholesome laws be not enacted, relative to the naturalization upon our shores of the degraded of all nations, we may bid farewell to the noble institutions reared through the blood of our fathers.

There has been considerable agitation among the laboring classes, in various parts of the country, in relation to the improvement of their condition. However we may view some of the courses they have adopted, the calls of these men for the discussion of their situation, appear to us to demand much more consideration than they have received. Supposing them to be incorrect in some of their principles and conduct, when we remember the fact that a large portion of them have not been sufficiently educated to know how to pursue the best course for their elevation, we shall find reason to exercise charity towards their failings—and, so far from suffering our interest in their welfare to be diminished, it is our duty, the situation of the country presses us, to examine their condition—physical, moral and intellectual—and to do everything in our power that will tend to their improvement. Comparatively little, perhaps, can be done for the ignorant who are somewhat advanced in life; but there is ample opportunity to benefit those who are soon to occupy their places, and whose moral and intellectual elevation constitute the future hope of the country.

The consideration of this subject has led us to the opinion that what is called the 'ten-hour system' of labor, which has been agitated somewhat in this city—although its adoption here is looked upon by many as at least uncalled for, if not fraught with many evils—is, on the whole, highly necessary to the extensive improvement of the laboring population, and calculated, through them, to promote the good of the community at large. It has been carried into effect to a considerable extent in New York and Philadelphia; and we cannot but believe, that when the liberal-minded men of New

England, who are now opposed to the system, shall have examined the subject in all its bearings, they will be convinced, not only of its justice and general advantages, but of the necessity of its adoption, as one of the first steps towards fitting a large class to act the important part of republican citizens—notwithstanding many individuals have surmounted the difficulty of excessive labor, among other obstacles which ought not to have been in their way. We think the decision of most physicians would accord with the opinion of others who are well acquainted with the subject, that the physical constitution, generally speaking, will not bear more than ten hours' labor a day without injury, except in cases where persons are uncommonly robust. But, be this as it may, comparatively few men can be found who possess disposition or energy, after laboring more than this number of hours, either to engage in their own intellectual improvement, or, if heads of families, to go through their domestic duties in a proper manner—especially as relates to the management and education of their children. They must have time—and their physical powers must not be exhausted. The only plausible objection to this system—that the leisure thereby obtained may not be properly improved—appears to us to have no solid foundation. Without asking what reason there is for affirming that the majority of the laboring class are not as likely to employ their leisure profitably as the same portion of any other order of society, how does the objection stand, in itself considered? What is the argument? It amounts simply to this,—that men ought not to have opportunity for improvement, because they may not improve the opportunity. This principle, carried out, would of course abolish the day set apart for moral and religious improvement, together with all similar privileges with which society is favored.

There may be employments which require more labor at one season than at another, and which afford considerable time for mental and moral culture; but there is no difficulty in adapting the system of labor under discussion to all cases of emergency in business; and wherever no grievance is felt on the score of time, it is contrary to the principles of the system to require any change.

It is objected to republican institutions, by the best writers of the monarchical school, that a popular community, by reason of its vocations requiring nearly all its time and attention, can never be fitted to take government into its own hands. What part of this proposition can be reasonably objected to, except that it is not a fact that the occupations

of the laboring classes *necessarily* require so much time as they command through the present general system of labor? It appears to us there is little difficulty in proving, that all who are opposed to giving these classes opportunity for moral and intellectual improvement, and all laborers themselves who do not believe in the necessity of such improvement, belong to the purest order of monarchists, in principle, however much republicanism they may think themselves to possess.

We are also of the firm conviction, that while the laboring population are obliged to toil, upon the average, from eleven to fifteen hours a day, it is not only impossible for them, as a body, properly to perform their moral, religious and political duties, but that they cannot, so far as they are concerned in the arts, pursue those studies which are indispensable to their becoming finished scientific workmen. We are aware of the general belief, that the study of the sciences is not necessary with the mass who are engaged in the various active pursuits. But this narrow view is fast going out of date. The intimate connection between the arts and sciences, is beginning to be more extensively acknowledged. The progress of *steam*, if nothing else, will ere long convince the most incredulous, that the great mass of mankind were made for something beside mere machines. The sciences of law and medicine are no more closely connected with the practice of the lawyer and the physician, than mechanical and agricultural science with the business of the mechanic and the farmer; and in this respect, therefore, as well as in others, the business professions deserve a no less honorable rank than the learned. The same may be said of other sciences—as, for instance, of Political Economy, in its application to mercantile affairs, although a knowledge of it is not generally thought indispensable to becoming a finished merchant. This connection between science and art affords, to our mind, one of the strongest arguments in favor of republican institutions; from the fact, that where it is well understood, and opportunity for study is allowed, it induces a mental discipline eminently calculated to fit the community at large properly to appreciate and sustain them. But there must be considerable modification of the present system of labor, before the most extensive benefits of this connection will be realized.

Holding these views, we were somewhat surprised at the rejection of the recent petition to our city government for a meeting to consider the ten-hour system of labor, so far as it related to persons employed on the public works. We

believed a full discussion of the subject the best way of disposing of it, and of preventing the 'turn-out' principle from being carried into execution; and did not then doubt but the petition would be granted. We now think, however, that the main objection, either to the discussion or adoption of the system, is founded on a wrong view of what is proposed by it; which, perhaps, is to be expected, as this, together with the whole subject of the rights of laborers, has never been matter of very general interest. It is true, the laboring classes have not been entirely free from blame, in relation to this lack of interest. Many of them have had too much the appearance of wishing to create hostility between their own and other orders of society; and consequently, at least towards those possessing this appearance, hostility has been created. Admitting there is, with a large portion of the community, an alarming amount of indifference towards the rights and interests of the laboring population, it is not strange that very few are willing to discuss calmly a subject pressed upon them, as they consider it, by men who are desirous of tearing up all the foundations of society. The fact is, before extensive good will be done by those engaged in the cause of manual laborers, it must be admitted that the term 'working man,' in its broadest sense, does not apply exclusively to persons of any particular calling. If any one class has a special claim to the title, it is that engaged in the learned professions. The labor of mechanics and others, who work a reasonable amount of time—say ten hours a day—is conducive to the health of body and mind; while that of the other class, faithfully performed, is often prejudicial to both. The absolute necessity of an extensive division of labor, is beyond all question; and nothing is more ridiculous than for one class of mankind to decry the profession of another. Every reasonable man who examines the subject, must see that all classes depend upon each other—and that it is the duty and for the interest of each class, while it shall do all in its power for its own prosperity, to regard with the same interest the prosperity of all other classes. Nothing is more unnatural and destructive than war between the different orders of society.

Neither will the simple cry of *aristocracy* effect the reform required by manual laborers. The same old enemy of mankind—*popular ignorance*—is at the bottom of all aristocracy; and the shortest way to the complete accomplishment of their purposes, as well as of all the ends of republicanism, is the destruction of that. All stumbling-blocks of an arbitrary

character in the way of their improvement should be removed —and nothing unnaturally calculated to depress them, should be suffered to continue; but it should be constantly borne in mind by them, no less than by all the friends of our institutions, that without moral and intellectual cultivation, little permanent good can be effected. There is as much of the spirit of aristocracy among the laboring classes, as among any other order of society. The difference is only in the degree of ability to exercise it; and it shows itself just in proportion as this ability is increased. And after all, it may be found that improper competition of laborer with laborer, and the jealousies existing between them, have far more tendency to depress these classes, than any aristocratic or other influences which are so much talked of.

But all this does not alter the fact, that in this as well as in other countries, though not to the same extent, their condition calls for extensive amelioration—and that the other classes are so exclusively engaged in their own affairs, that the laborer is not only greatly neglected, but constantly liable to have his rights trampled upon, and to be injured by the competition of foreigners, whose increase ought to be checked by prudent legislation.

Leaving the faults of the laboring classes, therefore, to be exhibited in detail by their enemies, if they have any, it is the object of these brief remarks, to enforce the strong necessity of the more elevated of our community taking a deeper interest in their condition, with special reference to its bearing on the institutions of the country. And, in conclusion, we will only ask, if the present state of things does not call loudly upon every friend of equal rights and just laws, seriously to reflect? Is there no duty to be discharged? Is there nothing to be apprehended from the great mass of uneducated mind, whose restless heavings are felt in every part of the land? Is there no danger that this chaos of intellect may ere long break forth, like the rushing storm, and cover the country with desolation, far and wide?

MECHANICAL DEXTERITY OF THE CHINESE.

This people discover no want of genius to conceive, nor of dexterity to execute; and their imitative powers are always acknowledged to be very great. Complicated glass lustres, consisting of several hundred pieces, were taken down piece

by piece, in the course of half an hour, by two Chinese, who had never seen any of the kind before, and were put up again by them with equal facility; yet Mr. Parker thought it necessary for our mechanics to attend at his warehouse several times, to see them taken down and again put together, in order to be able to manage the business on their arrival in China. A Chinese undertook to cut a slip of glass from a large curved piece, intended to cover the great dome of a planetarium, after our artificers had broken three similar pieces in attempting to cut them with the help of a diamond. It is well known that a Chinese in Canton, on being shown an European watch, undertook to make one like it, and succeeded, though he had never seen anything of the kind before; but it was necessary to furnish him with a main-spring, which he could not make; and they now fabricate, in Canton, as well as in London, and at one third of the expense, all those ingenious pieces of mechanism which at one time were sent to China in such vast quantities from the repositories of Cope and Merlin.

REED MACHINE.

[Copied by request, from the Plymouth Memorial.]

I OBSERVED in the Memorial a notice of Stephen Chubbuck's alleged improvement in the Nippers of the Reed Machine, which has induced me to send you the following account of the useful improvement which has been made on them. In March, 1834, a patent was granted to me for an improvement in the Reed Machine, so called. To use my improvement, the nail is not carried by the moving knife entirely down to the notch in the back piece, or piece under the stationary knife, but a portion of it remains pressed against the projecting part of the back piece by the spring guage, until the instrument which I have added and called a spring nipper, strikes it on the side opposite the back piece, and in a line a little below the upper surface of the notch, and in its motion horizontally turns the nail on the corner or edge of the notch a quarter of a circle into the notch. This nipper is attached to the old nipper, or passed through the post to which the old nipper is fastened, and fastened therein by a wedge. This mode I think preferable, and it receives the motion horizontally by being connected with the old

nipper; the nail by turning causes the spring nipper to descend, and after the nail has been turned, the elasticity of the nipper holds it upward, and being followed by the old nipper in a horizontal direction, the nail is secured correctly for the griping dies to embrace it. The old nipper has sometimes been formed by passing through a mortise in a vertical post, and held by a screw pin passed through one side or cheek of the mortice and pressed against it.

Mr. Chubbuck has passed the pin quite through the nipper and post, and made the mortice a little larger than the nipper, so that when it performs the operation for which I make the spring nipper, it may like that descend when the nail turns; and that it may return, he has extended the nipper beyond the post and connected it to a spring, and has termed it a joint nipper. Previous to his applying for a patent, I informed him that among the various experiments which I had made for turning the nail, a joint nipper was one. His inducement and object in applying for a patent has not been developed to me. His arrangement deprives the old nipper of its usual operation of holding the nail in the manner for which it was designed, and converted it into a spring nipper, which does not prove to be any improvement over the use of both nippers, and is no more than I had done in my experiments previous to his applying a spring to the old nipper. When my improvement is used in the form specified in my patent, it performs to entire satisfaction.

The facility with which nailors have been able by a description of my improvement to apply it to useful practice, shows its superiority over any mode previously invented, and I have been careful not to claim anything in my patent which can be claimed by any other person.

MELVILLE OTIS.

NOTES FOR DECEMBER.

QUADRATURE OF THE CIRCLE.—The celebrated Dutch geometrician Van Ceuban, devoted the greater part of his life to the task of ascertaining the exact proportion between the diameter of a circle and its circumference; and in order to arrive at the utmost degree of accuracy, carried it to one hundred places of figures. He directed at his death that these figures should be engraved upon his tombstone.

Felling Trees.—Not long since, a machine has been invented for felling forest trees, which, it appears, acts upon the saw principle, and by the aid of two men, will cut down a tree of from twenty to twenty-four inches diameter in five minutes. It requires but very little more space than is required to swing an axe. The cost of constructing is about 50 dollars. The inventor is Mr. James Hamilton, of New York.

Invisible Cloth.—The fineness of the muslin of India is proverbial. It has been manufactured of so delicate a texture that when laid on the grass, and wet with dew, it was not discernable.

Plate Glass.—A French paper states that the largest piece of plate glass ever manufactured, has just been finished at the Gobin. It is 175 French inches high by 125 wide.

Fire Brick.—A kind of fire brick has been made, it is said, by mixing *agaric mineral*, and clay, in certain proportions, which will float on water.

Seeing Stars in the Daytime.—A common opinion has been, that by looking through a long tube, or from the bottom of a deep well, the stars may be seen. It is stated, on the authority of one of the most eminent astronomers now living, M. Arago, that this is a mistake.

Pin Machinery.—An invention has been exhibited in New York, which is said to enable a man to make a pin in a second, from plain wire.

Water Proof Glue.—Soak common glue in cold water till it becomes completely soft, without changing its form; then dissolve it in warm linseed oil, and apply it as usual. It will dry quickly.

Magneto-Electric Power.—Prof. Green, of Philadelphia, has imported a magnet from London, the electric sparks from which decompose water, and heat platinum wire red hot.

Cooking by Gas.—Experiments seem to have settled pretty satisfactorily the point that gas may be used as fuel for cookery.